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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/640,204	08/16/2000	Andrew C. Singer	1201.63069	3214

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EXAMINER

CORRIELUS, JEAN B

ART UNIT	PAPER NUMBER
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2631

11

DATE MAILED: 04/19/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/640,204

Applicant(s)

SINGER ET AL.

Examiner

Jean B Corrielus

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 24 February 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-14 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-12 is/are rejected.
- 7) ☒ Claim(s) 12-14 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ 6) ☐ Other: _____

DETAILED ACTION

Claim Objection

1. Claims 11-14 are objected to because of the following informalities. Claim 11, lines 6, "estimates output distribution" should be replaced by "estimate" so as to be consistent with antecedent in line 4.

Claims 12-14 are likewise objected because of their dependency to claim 11.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

3. Claims 1-7 and 9-11 are rejected under 35 U.S.C. 102(e) as being anticipated by Gamal et al US patent No. 6,671,338.

As per claims 1, 10 and 11, Gamal et al discloses a method and apparatus (fig. 6 or fig. 7) having a SISO MMSE equalizer 144 having an input for receiving data from a noisy channel see fig. 6; inputting a set of prior symbol values on feedback path to said equalizer144; equalizing by an MMSE equalization in the SISO equalizer 144 the data received over the noisy channel

and the set of prior symbol values to produce a symbol value estimate; using the decoder 150 to decode (mapping) the equalizer output onto the prior symbol values to produce a confidence indication in each of the symbol value estimate as a function of time (see abstract).

As per claim 2, Gamal et al includes inherently the further step of setting parameters of the equalizer 144 in accordance to MMSE criterion over the channel noise and the symbol values.

As per claim 3, Gamal et al further comprising the steps of passing the output of the equalizer to a SISO decoder 150 and using the output of the error decoder as the set of prior symbol values and repeating all steps of the method until a predetermined convergence criterion is reached between said SISO error correction decoder 150 and said Equalizer 144.

As per claim 4, the method further includes the step of deinterleave the output of the equalizer prior to decoding see fig. 7.

As per claim 5, the step of equalizing inherently excludes symbol value estimates which are functions of an input distribution of a current symbol being equalized.

As per claim 6, the decoder inherently excludes symbol value estimates which are function of an input distribution of a current symbol being decoded.

As per claim 9, the method further comprises the steps of deinterleaves and reserializing data output of the equalizer; decoding the

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deinterleaved data and repeating the steps until a predetermined convergence is met between the equalizing and decoding steps see fig. 7.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 7, 8 and 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gamal et al US patent No. 6,671,338.

As per claim 7, Gamal discloses every feature of the claimed invention but does not explicitly teach the further limitation of using a fast update equalization of order of M^2 , which exploits redundant computations in successive equalizer computations. However, as acknowledged by applicant in the response, filed on 10/20/03, see comment section, using a fast equalizer update in the order of M^2 is old and well established in the art. Given that, it would have been obvious to one skill in the art to implement the equalizer using such an update algorithm in order to enhance the equalization process.

As per claim 8, applicant comment filed on 10/20/03 further stated that applying a matrix inversion lemma to a matrix to be inverted in a design of equalization coefficients for the SISO MMSE equalizer is old and well

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established in the art given that fact it would have been obvious to one skill in the art to apply such matrix in Gamal et al and the reason to do so would have been the same as provided in reference to claim 7 above.

As per claim 12 it would have been obvious to one skill in the art to decode (map) the estimates by treating the output distribution as conditionally Gaussian and distributed about the symbol values so as to increase system reliability.

Allowable Subject Matter

6. Claims 13 and 14 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Response to Arguments

7. Applicant's arguments with respect to claims 1, 11 and 12 have been considered but are moot in view of the new ground(s) of rejection.

8. **Any response to this action should be mailed to:**

Commissioner of Patents and Trademarks

Washington, D.C. 20231

or faxed to:

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(703) 872-9314

(for informal or draft communications, please label
"PROPOSED" or "DRAFT")

Hand-delivered responses should be brought to Crystal Park II, 2121 Crystal
Drive, Arlington, VA., Sixth Floor (Receptionist).

9. Any inquiry concerning this communication or earlier communications from
the examiner should be directed to Jean B. Corrielus whose telephone number is (703)
305-4023. The examiner can normally be reached on Monday-Thursday from 7:00 A.M.
to 5:30 P.M.

If attempts to reach the examiner by telephone are unsuccessful, the
examiner's supervisor, Mohammad Ghayour, can be reached on (703) 306-3034.

Any inquiry of a general nature or relating to the status of this application
or proceeding should be directed to the Group receptionist whose telephone
number is (703) 305-3800.


Jean B. Corrielus

Primary Examiner

TC-2600 4/15/04